Technical Workshop on Estuarine Habitat in the Bay Delta Estuary

Managing the Low Salinity Zone to Improve Estuarine Habitat and Protect Fish Populations

27 March 2011
Tuesday
8:30 – 5:00

CalEPA's Coastal Room
1001 "I" Street, Sacramento

Purpose: Convene a scientific workshop to document the response of selected biological indicators and ecological processes to changing locations of the low salinity zone in the Bay Delta Estuary.

Desired Outcomes:

1. The input of scientists on using 3D models to map and quantify the changing volume of estuarine habitat as the low salinity zone (LSZ) moves between four locations in the Carquinez Strait and Western Delta.

2. The identification of biological indicators and ecological processes that respond to different positions of the LSZ, and can be used as measures of ecosystem health (see chart on page 3).

3. The articulation of a scenario that describes changes in the volume of estuarine habitat due to climatic variability and water management decisions for all seasons of the year.

4. The input of scientists on a paper to be prepared by the Aquatic Science Center (ASC) to be submitted to the SWRCB for their proceedings on Delta Outflow Standards.

Logistics & Materials:

1. A compilation of the ~20 most significant scientific papers prepared about X2, the low salinity zone, and the corresponding ecological community.

2. A common dataset on environmental conditions in the upper estuary as measured by IEP, USGS, UCSF and others (with an emphasis on data produced since 1994).

3. Model outputs from UnTRIM showing and quantifying the volume and areal extent of estuarine habitat associated with different values of X2 and different locations of the LSZ.

4. A white paper comparing UnTRIM results with X2 results for species previously associated with X2 (using Kimmerer's paper from 2002 as a baseline).

Framework for Technical Workshop:

1. Estuarine habitat as modeled in 3D vs X2
    a. Assess modeling accuracy
    b. Compare with habitat calculations for Delta Smelt (Feyrer et al.)
    c. Correlate with other species
    d. Describe nature of relationships
        i. UnTrim Modeled areal extent, volumetric extent, centroid vs X2
        ii. With LSZ species
            1. Desirable species; compare with Jassby et al. (1994) and Kimmerer (2002)
            2. Undesirable species
        iii. With species of higher salinity regimes
    e. Other stressors and geographic specific impacts
        i. Intakes of SWP, CVP, CCWD, Mirant
        ii. Outfalls
    f. Possible importance of geometry and geography
        i. Cross-sectional diversity
        ii. Connectivity to other habitats, particularly Suisun Marsh

2. What are predictive models associated with unimpaired inflows, storage levels
    a. Time steps – weekly, monthly, seasonally?
    b. Different seasons
        i. Flood control
        ii. Water storage
        iii. Water delivery
    c. Changes in relationships through historic data
        i. Trends
        ii. Step changes

3. How could estuarine habitat be adaptively managed to ensure protection?
    a. Performance measures: evaluate how well management actions achieve desired level of protection (in terms of habitat quantities)
    b. Indicators: evaluate biological responses expected from management actions
    c. Sampling strategies: discuss scale, intensity, and methods of sampling
    d. Flexibility: discuss whether short-term manipulations are consistent with targeted level of protection.

BIOLOGICAL INDICATOR	METRIC
RESPONSE OF FISH STUDIED AT "X2" WORKSHOPS	
Neomysis mercedis	Metric TBD
Crangon franciscorum	Metric TBD
Molluscs	Metric TBD
Striped bass	Metric TBD
Starry flounder	Metric TBD
Longfin smelt	Metric TBD

FOOD PRODUCTION	
Area of Low Salinity Zone	Hectares
Volume of Low Salinity Zone	Cubic Meters
Time LSZ Spends in Proximity to Productive Habitat	Minutes

PRODUCTIVITY OF THE PHOTIC ZONE	
Depth of Penetration by Sunlight through Water Surface	Centimeters
Turbidity	Nephelometric Turbidity Unit (NTU)

ECOSYSTEM PROCESSES	
Diversity of Aquatic Habitat at Four Cross Sections	Numerical Index TBD for Habitat Structure for Fish, e.g., # of feeding spots, # of hiding spots.
Diversity of Flow Patterns at Four Cross Sections	Metric TBD
Interfaces of Currents with Accumulations of Food	Metric TBD

CONTAMINANTS	
Ammonium	Inhibit diatoms/promote microcystis ($\mu mol\ L^{-1}$)[1]
Selenium	Biological capture by overbite clams ($\mu g\ L^{-1}$)[2]

SITE SPECIFIC STRESSORS	
Time LSZ Spends in Proximity to Outfalls	Minutes
Time LSZ Spends in Proximity to Pumps	Minutes
Time LSZ Spends in Proximity to *Egeria* Beds	Minutes
Time LSZ Spends in Proximity to Deep Channels	Minutes
Time LSZ Spends in Proximity to Power Plants	Minutes
Time LSZ Spends in Proximity to CVP/SWP Effects	Minutes

[1] See Dugdale's model

[2] See models by Luoma & Presser (fate of Se) and by Jan Thompson (clam abundance)